APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
BRINEY III, WALTER F

ART UNIT	PAPER NUMBER
2615	

DATE MAILED: 10/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>07 August 2006</u>.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1,3-9,11,13,15 and 17-20</u> is/are pending in the application.

    4a) Of the above claim(s) <u>9,11,13 and 15</u> is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1,4-8,18 and 19</u> is/are rejected.

7)☒ Claim(s) <u>3,17 and 20</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 07 August 2006 has been entered.

Election/Restrictions

Newly amended claims 9, 11, 13 and 15 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

As originally filed, independent claims 1 and 9 performed substantially the same process, including: (1) defining a threshold, (2) calculating a zero crossing rate, (3) extracting a set of parameters, (4) calculating a maximum difference between said parameters and (5) comparing said maximum difference with said threshold. These five core steps represent a <u>combination</u> of elements, which shall be referred to as AB_{BR}. As currently amended, independent claim 9 recites a system that performs only those steps further comprised by step (2). As such, claim 9 is limited to a <u>subcombination</u>, which shall be referred to as B_{SP}. Pursuant to MPEP § 806.05(c)(II)(A and B), claims to B_{SP} are not permissible in the presence of claims to AB_{BR}.

Since applicant has received an action on the merits for the originally presented

invention, this invention has been constructively elected by original presentation for

prosecution on the merits. Accordingly, claims 9, 11, 13 and 15 are withdrawn from

consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and

MPEP § 821.03.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1.   **Claim 19 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.**

Claim 19 contains subject matter which was not described in the specification in

such a way as to reasonably convey to one skilled in the relevant art that the

inventor(s), at the time the application was filed, had possession of the claimed

invention.

In particular, claim 19 recites "defin[ing] a threshold for zero amplitude change <u>by</u>

<u>determining, for a signal with a zero value amplitude at a zero crossing point, a tangent</u>

<u>value of the signal, and by defining the zero value amplitude as a non-zero value</u>

<u>depending upon the tangent of said signal at the zero crossing point</u>." The applicant's

specification does support defining a threshold in box 41 of figure 3, where the threshold

is based on whether there is a zero amplitude change. See page 12, paragraph 29.

However, the same section of the specification states that the threshold defined in box

41 is used "for comparison against a sum of durations between zero crossing points...to

determine whether a frame contains tone data." There is absolutely no suggestion that

a threshold for zero amplitude change is defined in the manner claimed, nor is there any

suggestion that a threshold for zero amplitude change even exists.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2.   **Claims 1, 4-6 and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Hsieh (US Patent Application Publication 2004/0176062).**

Claim 1 is limited to "a method for defining tone signals in a voice activity

detection (VAD) device." In rejecting this claim it is noted that Hsieh discloses a method

for detecting a tone signal through digital signal processing. See Abstract. In operation,

the tone detector of Hsieh performs a zero crossing rate (ZCR) measurement of an

input signal in step (106) of figure 4. See paragraph 21. Following the ZCR

measurement, a set of parameters from a plurality of zero crossing periods contained

within a frame period are extracted in steps (108) and (110). See paragraphs 22 and

23. The parameters are used to calculate an average value and a variance in steps

(114) and (116). See paragraphs 25 and 26. It is noted that the variance includes

calculating the difference between a single value of a random variable X and the mean of said variable. Finally in step (118) the variance is compared to a threshold, the result determining the presence or absence of a tone. See paragraph 27.

With respect to the claim language, it is submitted that step (106) corresponds to the step of "determining zero crossing points of the signal;" steps (108) and (110) correspond to "extracting a set of parameters from the sequence of duration periods that are between the zero crossing points;" steps (114) and (116) correspond to "calculating a difference between a summed mean of said sequence of duration periods and a duration period in a single frame of said signal;" and step (118) corresponds to "comparing said difference with said threshold." Furthermore, the fact that the variance is compared against a threshold inherently necessitates the first step of the method as claimed, i.e. "defining a threshold to compare with a difference between a sequence of duration periods in an incoming signal to a duration period of a single frame of the signal." Therefore, Hsieh anticipates all limitations of the claim.

Claim 5 is limited to "the method of claim 1," as covered by Hsieh. The variance corresponds to the maximum difference, and is inherently of the form $E((X - \mu)^2)$. In other words, the variance is the average of the square of the distance of each data point from the mean. In this case, X corresponds to the number of samples of each period calculated in step (110) and μ correspond to the average calculated in step (114). In this way, it can be see that the variance is calculated between a sum of all said durations (μ) and a single period between zero crossing points of said duration of the single frame (X). Therefore, Hsieh anticipates all limitations of the claim.

Claim 18 is limited to "the method of claim 1," as covered by Hsieh. Claim 1,

from which claim 18 depends, recites "a method for defining tone signals in a voice

activity detection device." As seen in figure 3 of the applicant's specification, the tone

defining method either defines a frame as a tone frame 58 or as a non-tone frame 56,

voice activity is not ultimately determined in the tone determination process. The

claimed method of "defining tone signals" is simply not limited by downstream

procedures executed in the VAD, such as "declaring the sample as containing a voice

tone." As the language of this claim does not limit its parent, Hsieh anticipates all

limitations of the claim for the same reasons presented apropos claim 1.

Claim 4 is limited to "a method for defining tone signals in a voice activity

detection (VAD) device." In rejecting this claim it is noted that Hsieh discloses a method

for detecting a tone signal through digital signal processing. See Abstract. In operation,

the tone detector of Hsieh performs a zero crossing rate (ZCR) measurement of an

input signal in step (106) of figure 4. See paragraph 21. Following the ZCR

measurement, a set of parameters from a plurality of zero crossing periods contained

within a frame period are extracted in steps (108) and (110). See paragraphs 22 and

23. The parameters are used to calculate an average value and a variance in steps

(114) and (116). See paragraphs 25 and 26. Finally in step (118) the variance is

compared to a threshold, the result determining the presence or absence of a tone.

See paragraph 27.

With respect to the claim language, when a zero crossing period is not detected

in step (106), the method of figure 4 loops back to the initial filtering steps and attempts

to discover a period in view of further samples. In this way, a range of the input signal is

defined, where the range includes a zero crossing point. After a period has been

determined in this way, its parameters are extracted in steps (108) and (110); a

summed mean and a variance for a plurality of periods contained within a frame period

are calculated in stepns (114) and (116); and the variance is compared to a threshold in

step (118). The threshold is inherently defined. Therefore, Hsieh anticipates all

limitations of the claim.

Claim 6 is limited to "the method of claim 4," as covered by Hsieh. The variance

corresponds to the maximum difference, and is inherently of the form $E((X - \mu)^2)$. In

other words, the variance is the average of the square of the distance of each data point

from the mean. In this case, X corresponds to the number of samples of each period

calculated in step (110) and μ correspond to the average calculated in step (114). In

this way, it can be see that the variance is calculated using a mean difference $E((X-\mu)^2)$

between a sum (μ) of all said durations within said defined range. Therefore, Hsieh

anticipates all limitations of the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

3.   **Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsieh.**

Claim 7 is limited to "the method of claim 1," as covered by Hsieh. It is noted

that the tone detection algorithm disclosed by Hsieh is not specifically directed toward

detecting signals according to the ITU G.729 Annex B for a VAD device. Therefore,

Hsieh anticipates all limitations of the claim with the exception noted above.

In addition to detecting tones according to CTCSS standards, Hsieh discloses

that the tone detecting method disclosed therein is applicable in other apparatuses for

detecting signals of predetermined frequency. The examiner takes Official Notice of the

fact that the ITU G.729 Annex B recommendation for VAD devices was well known at

the time of the invention. Furthermore, it is known from the disclosure of Hsieh that

tone detection can be performed using the method discussed therein for any various

tones of predetermined frequency, e.g. ITU G.729 Annex B tones.

It would have been obvious to one of ordinary skill in the art at the time of the

invention to detect tones defined under the ITU G.729 Annex B recommendation for

VAD devices using the method of Hsieh, which provides advantages over the prior art

as recited in the section entitled Description of the Prior Art and Summary of Invention.

4.   **Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsieh in view of
        Tasaki (US Patent 6,526,378).**

Claim 8 is limited to "the method of claim 1," as covered by Hsieh. It will be

appreciated that Hsieh simply fails to supply a method of calculating the ZCR of the

input signal. Therefore, Hsieh anticipates all limitations of the claim with the exception

wherein said calculating said maximum difference comprises calculating a product

between the sample and the sample's adjacent sample in a group of signal samples.

Tasaki teaches a prior art zero crossing method that overcomes the deficiency noted in the previous paragraph. Specifically Tasaki teaches a method and apparatus for processing sound signal. See Abstract. Of most concern though is the simple zero crossing rate calculator as taught in column 23, lines 52-62. In operation, two adjacent samples are multiplied. If and only if their result is equal to or less than zero, a zero cross will have been detected and counted. It is submitted that the zero crossing rate calculation above is integral to determining the maximum difference, and therefore, comprises the calculating of said maximum difference.

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a ZCR as taught by Tasaki if for no other reason than Hsieh fails to disclose the particulars of zero crossing rate determination, which necessitates the need to find an enabling teaching within the prior art.

Allowable Subject Matter

The following is a statement of reasons for the indication of allowable subject matter:

5.   **Claims 3, 17 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.**

Claim 3 is limited to "the method of claim 1," as covered by Hsieh. The prior art of record simply does not disclose or teach adjusting the threshold in response to a sample's value being changed from zero to a non-zero value. Thus, claim 3 is allowable over the cited prior art.

Claim 17 is limited to "the method of claim 1," as covered by Hsieh. It is noted that neither Hsieh nor Tasaki teach "changing the signal amplitude from zero to negative one if the tangent is negative and changing the signal amplitude from zero to positive one if the tangent is positive." Thus, claim 17 is allowable over the cited prior art.

Claim 20 is limited to "the method of claim 4," as covered by Hsieh. It is noted that neither Hsieh nor Tasaki teach "changing the signal amplitude from zero to negative one if the tangent is negative and changing the signal amplitude from zero to positive one if the tangent is positive." Thus, claim 17 is allowable over the cited prior art.

Response to Arguments

Applicant's arguments filed 07 August 2006 have been fully considered but they are not persuasive.

On page 10, the applicant alleges that Hsieh uses a ZCR operation to determine if a period of a signal contains speech or not, which is incorrect. In contrast, the CTCSS decoder of Hsieh is using the ZCR operation to detect tones in the same manner as claimed. See paragraph [0006], which recites: "[t]he CTCSS decoder 16 identifies the frequency of <u>a tone signal</u>." Although this paragraph is describing the prior art method used by a CTCSS decoder, the goal is the same as that disclosed: identify a tone signal describing which logical channel is in use.

On page 11, lines 1-7, the applicant alleges that Hsieh uses a threshold in step 118 to determine whether a speech signal uses a specific logical channel, which is different than using the threshold to determine speech. The examiner agrees, however, claim 4 is not limited to detecting speech, only tone signals.

On page 11, lines 8-18, the applicant alleges that in Hsieh's method, a sample that does not cross the zero-line threshold it counts as not containing speech. Again, it is noted that the tone detector depicted in figure 4 of Hsieh is for tone detection alone, not voice detection. However, if a sample has not crossed the zero line it is said that a period of a tone signal is incomplete. The process of figure 4 loops back to step 106 by way of step 112 to define a range that does contain a zero crossing or until z frame period is complete.

On page 11, line 19, through page 12, line 3, the applicant contests that Hsieh does not handle the absence of a zero crossing at all. The previous paragraph shows this to be false, however, it is posited that Hsieh fails to handle the case where no zero crossing occurs in an entire frame. However, figure 3 of applicant's specification only seems to handle zero crossings in single frames as well.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter F. Briney III whose telephone number is 571-272-7513. The examiner can normally be reached on M-F 8am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on 571-272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SINH TRAN
SUPERVISORY PATENT EXAMINER

WFB